# Opioid-involved deaths in Broome County

Christopher W. Ryan, MD, MS

October 14, 2016

## 1 Background

Opioids (sometimes ambiguously referred to as "narcotics") are chemicals that bind to opioid receptors in the brain, causing a variety of effects: euphoria, relief of pain, and respiratory depression being clinically the most relevant.

The primary *natural opioids* derived from opium poppies are morphine and codeine. These can be chemically modified to yield *semi-synthetic* opioids such as hydromorphone, hydrocodone, oxycodone, and heroin. Fully *synthetic* opioids include fentanyl, methadone, and tramadol.

Opioids are available for medical use in a variety of forms. Several are available as the sole active ingredient in a tablet. Others are manufactured into tablets containing other analgesics as well, typically acetaminophen or ibupfrofen. Typical examples of the latter are Vicodin (hydrocodone plus acetaminophen), Percocet (oxycodone plus acetaminophen), and Vicoprofen (hydrocodone plus ibuprofen). Some are available as sustained-release tablets that permit less-frequent dosing. Some are available in formulations that can be absorbed through the lining of the mouth, useful in patients who cannot swallow. One, fentanyl, is available in a patch, from which the medicine is absorbed through the skin. Several opioids are available in injectable form, used primarily for hospital inpatients. Patients suffering from opioid addiction have developed a variety of other, creative, methods of administration, such as dissolving tablets for intravenous injection, or chewing fentanyl patches.

Because of their euphoric effects, opioids are subject to abuse, and patients can become addicted to them. Patients, whether addicted or not, can sometimes overdose on opioids. Patients can overdose with their own prescribed opioids, another person's prescribed opioids, or non-prescribed opioids (eg heroin). Opioid overdose can be fatal, usually via respiratory depression. The frequency of fatal opioid overdose is the subject of this brief report.

## 2 Methods

The definitive source for cause-of-death data is the death certificate. The certifier (who is usually the patient's physician or the coroner) completes the cause- and manner-of-death sections on the death certificate based on what they know of the patient, the death scene, the autopsy, etc. The Broome County Health Department does not investigate individual deaths, nor does its personnel fill out death certificates.

The data from the completed certificates are then processed by the National Center for Health Statistics and the New York State Department of Health (NYSDOH) to maximize accuracy and completeness, and the causes are coded using the International Classification of Diseases. Although there is some unavoidable ambiguity and potential error in this coding process, it provides the final and most definitive information on the cause and circumstances of each death–the "gold standard" so to speak. There is currently no routine process that will provide better data.

The process of establishing that gold standard can take a long time. In disease surveillance, there is always a trade-off between accuracy and timeliness. So in the meantime, this report uses copies of

death certificates that the Broome County Health Department requests routinely from the municipal clerks. These "local" copies of the death certificate data are stored in a spreadsheet at the Broome County Health Department. There are no ICD-10 codes included in these data. Thus the question becomes, how to identify death certificates that represent opioid-involved deaths? The Council of State and Territorial Epidemiologists (CSTE) has created several lists of keywords which, when found on death certificates, they believe might indicate a drug-involved death, an opioid-involved death, or a heroin-involved death (or some combination). Those lists are available here: `http://www.cste.org/group/OverdoseWorkgroup`. The CSTE attempted to include common variations and misspellings of opioid-related words. This report uses those words, supplemented by a few additional misspellings and plural forms that were not included in the CSTE list such as "opiod," "opiods,", "opiates," "oxymorphine," as well as the pharmacologically ambiguous terms "narcotic" and "narcotics" that have sometimes been used in the past, to identify locally-stored death certificates that suggested an opioid- or heroin-involved death. Such cases were those death certificates that included any keyword in any of the following certificate fields:

- cause 1A
- cause 1B
- cause 1C
- cause 2
- Primary Cause
- Secondary Cause

Death certificates meeting one of those criteria are here considered "opioid-related" or "heroin-related," respectively. As heroin is a type of opioid, the list of opioid-related keywords includes all the heroin-related keywords.

For some deaths, the cause may still be under investigation; the more recent the death, the more likely this is to be the case. This could show up in a death certificate in a number of ways. The word "pending" or a variant of it might appear among the listed causes. Or there may be no listed cause, i.e. all the cause fields are blank. Both of these phenomena are tallied in this report.

# 3 Results

The database contains 29517 usable records, with 0 excluded for implausible dates. The earliest death certificate in the collection is from February 1999, while the latest is from October 2016.

The numbers of opioid-involved and heroin-involved deaths are shown in Table 1. Receipt and recording of data locally prior to about 2010 were incomplete, so those years are not shown.

In Table 1, "pending" means that at least one of the cause-of-death fields contained the word "pending" or a variant of it, whereas "no listed causes" means that all the cause-of-death fields were blank.

# 4 Limitations

There are several potential problems with computer-searching of free text cause-of-death descriptions, the method used in this report:

- Many recent deaths are still of "pending" cause, as the investigation continues. As long as the cause is "pending," these deaths will not be counted in this report as opioid- or heroin-related.
- Sometimes the cause-of-death words or phrases that certfiers use are vague or uninformative, like "cardiopulmonary arrest." Even if such a death was in fact opioid-related, it would not get counted by the method used here if no other, more specific, information was written on the death certificate.

Table 1: Total death certificates, and certificates involving opioids in general or heroin in particular, in Broome County. Asterisks inidcate counts less than 10.

| year | total death certificates | opioid-involved | heroin-involved | pending | no listed causes |
|---|---|---|---|---|---|
| 2010 | 1904 | 11 | * | 11 | 1 |
| 2011 | 2020 | 11 | * | 24 | 0 |
| 2012 | 1940 | 15 | * | 1 | 7 |
| 2013 | 2019 | 20 | * | 2 | 2 |
| 2014 | 1946 | 33 | 10 | 1 | 3 |
| 2015 | 2044 | 31 | 11 | 0 | 11 |
| 2016 | 1423 | 20 | * | 8 | 32 |

- The cause information on some death certificates may not have been entered into the computer spreadsheet that is the source data for this report. That tended to be more the case in years past, and less so in recent years.